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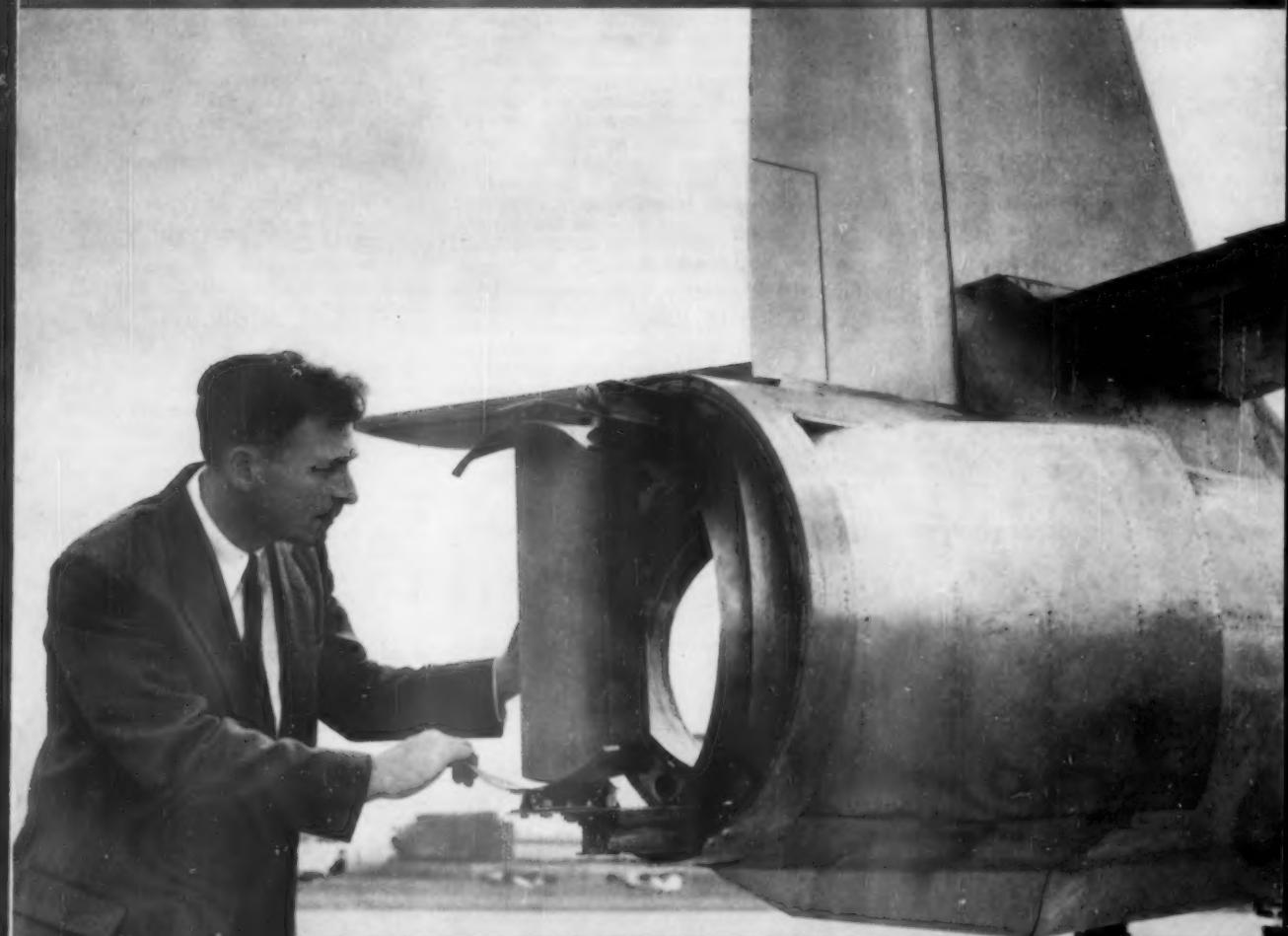
June 19, 1954

VOL. 35, NO. 29

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# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Turbojet Brake

See Page 387

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## PSYCHIATRY

# Chemical for Mental Ills

**Fight against mental disease by chemical therapy is new method showing great promise. Use of metrazol and insulin 20 years ago was the start.**

► A CHEMICAL to save men's minds, as sulfa drugs and antibiotics save men's lives seems close. The fight against mental disease through therapy with chemicals is gaining.

A prediction that "thousands of institutionalized mental patients will be able to return to their homes, families and jobs" has been made on the basis of results so far with one promising new medicine.

This medicine is called Serpasil. (See SNL, June 13, 1953, p. 365.) It has been on trial at Modesto State Hospital in California. Out of 73 patients treated, 20 have lost all symptoms and eight have been discharged.

Dr. Robert Noce, director of that hospital's clinical services, has stated that he believes "every type of the mentally ill can be helped, even some of the mentally retarded."

Changes in brain wave tracings back up the doctors' observations that the personalities of the patients are undergoing basic reorganization.

But Serpasil, derived from the snake-like root of an Indian plant and manufactured by Ciba Pharmaceutical Products Company, Inc., Summit, N.J., is only the latest development announced in the now promising chemical attack on mental sickness.

Equally good results were announced recently for another drug, chlorpromazine (see SNL, April 3, p. 213), and shortly after that a hormone treatment for mental disease was proposed on the basis of this hormone's chemical and physiological characteristics. (See SNL, May 8, p. 294.)

The modern chemical attack on mental sickness got its start about 20 years ago when metrazol and insulin were first used. Doctors were greatly heartened then because they saw apparently hopeless patients restored to sanity, and because the treatments seemed to show mental sickness might after all be a matter of body chemistry and, therefore, susceptible to rational treatment through chemistry.

However, metrazol and insulin seemed to act through the terrific jolt, or shock, they gave the patients. Treatment swung quickly to shock methods with electric currents used instead of chemicals.

The new medicines swing back to a much older approach, that of quieting and soothing the disturbed mind.

Chlorpromazine and Serpasil both are sedatives. In fact, when chlorpromazine was first brought out by Smith, Kline and French of Philadelphia in 1953, its quieting action was noted as a side effect. Interest then was on its ability to stop nausea and vomiting.

However, when Montreal doctors began

using it to quiet severely excited mental patients, they found it not only quieted the patients but brought about recovery and sustained absence of symptoms in 13 of 71. In seven cases, patients were able to leave the hospital and in another 27 symptoms were lessened.

Serpasil also was first reported in connection with non-mental disease patients. It was believed valuable for high blood pressure sufferers because of its soothing effect. The soothing quality had a "remarkable" effect on the Modesto Hospital violent patients but in addition the drug showed more remedial effect on the illness itself.

These drugs may not stand the test of time as remedies for mental disease. Some scientists will see more promise in the proposed use of the hormone chemical, serotonin. This is based on the finding that anti-serotonins, chemical antagonists to serotonin, cause mental aberrations that closely mimic serious mental diseases such as schizophrenia.

The cause of such mental disease might, therefore, be lack of serotonin in the brain or a block in the brain's ability to use it. Giving serotonin or a closely related chemical might remedy the mental sickness by attacking the cause, Rockefeller Institute for

Medical Research scientists suggested to the National Academy of Sciences meeting in Washington in April.

A similar approach to the problem of mental sickness comes from research by Boston scientists. They find they can bring on mental aberrations mimicking mental disease by a chemical called d-lysergic acid, or LSD for short. This chemical could be made in the body by faulty breakdown of adrenalin, hormone poured out by the adrenal glands when a person is faced with danger or in a stressful situation. This may be the link in the long-suspected relation between the adrenal glands, stress and mental disease.

From these many and diverse approaches, the hoped-for chemical cure for insanity may be coming.

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## AERONAUTICS

## Reverse Thrust Stops High-Speed Turbojets

### See Front Cover

► A WAY of stopping high-speed turbojet airplanes during landing has been developed by the National Advisory Committee for Aeronautics. The new device was demonstrated at the Lewis Flight Propulsion Laboratory, Cleveland.

It will make possible the use by modern jets of the relatively short runways of today's airports.

A double set of blades are locked inside the tail part. When these are moved into the propelling stream of hot gases, a reversal in thrust occurs. This acts as a brake,



**HIGH-TEMPERATURE RESEARCH**—A portion of an aircraft wing is exposed to intense heating from incandescent carbon rods in investigations at the NACA's Langley Aeronautical Laboratory. Such tests provide data on heating at flight speeds many times the speed of sound.

giving the same effect as a reversal of airplane propellers that is familiar to airline passengers in their landings. These blades are closed and tucked out of the way when the jet plane is actually in flight.

In the demonstration, a jet plane was actually made to move backwards on a landing strip through the use of this device, which is shown on the cover of this week's SCIENCE NEWS LETTER.

To provide wheel brakes of sufficient size to stop jets in their landing runs would require too much weight.

Aeronautical designers are looking forward to long-range missiles that will travel at the high speeds of 6,600 miles per hour. The temperatures reached at such speeds would be enough to melt any presently known materials. Such aerodynamic heat has been most pronounced when missiles that have climbed outside the earth's atmosphere re-enter it at an extremely high rate. The temperatures thus reached are sufficiently high to vaporize even diamonds.

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#### PSYCHIATRY

## Attendance at School

► MANY A school child who answers "present" at daily roll call is nevertheless absent from school, as many teachers know.

The child is present physically, not playing truant, but he is absent "psychologically." He attends school but stops learning. Yet he is average or above average in intelligence and has had good marks and passed from grade to grade up to a certain point.

The point is when emotional conflicts grow too much for the child to handle. He feels that disaster is about to overtake him and his only defense is to stop learning.

This explanation for psychological absence from school was discovered in the case of five boys by Dr. Mira Talbot and Mrs. Isabelle Henson, psychiatric social worker, of the Board of Education, City of New York. Details of the study are reported in the *American Journal of Orthopsychiatry* (April).

The five boys were treated through psychiatric social work without psychoanalysis. Four of them made a complete recovery and were able to continue learning again.

The fifth was a failure in treatment from the social worker's viewpoint because he gave up school and went to work as soon as old enough. However, he and his mother are satisfied with the results and he is enjoying his work and social life and "acts as though he had been relieved of an overpowering burden."

All five boys had lost their fathers, three through serious illness and death, one through divorce and one through complete domination by his wife. All the boys had been "pressured" by their mothers for academic success and at the same time prevented from achieving it by their mothers who had conflicts of their own. All the

#### ASTRONOMY

## Publish Sky Atlas

► THE FIRST section of a unique sky atlas, result of the most comprehensive survey of the heavens ever attempted, will be published next year.

As outstandingly beautiful as some of these photographs of the heavens are, probably only astronomical observatories and research institutions will place orders for the volume, since the cost is expected to be from \$1,600 to \$2,000 a copy, depending on the total number ordered.

The atlas will include a total of 1,758 14-inch-square photographs, covering all the sky visible from Palomar Mountain, taken with the 48-inch Schmidt telescope of Palomar Observatory. The negative prints will be copies of glass plates exposed in this telescope, each covering an area about as large as the Big Dipper's bowl.

The areas overlap slightly, and each one is photographed twice, on blue-sensitive

boys were afraid success in school would bring on them the fate suffered by their fathers. As a defense against this they found it impossible to go on learning, yet were expected to do so.

Relatively short treatment of the boys and, when possible of the mothers, lessened the power of the conflicting emotional forces enough so that four boys could get on with their school work again.

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#### PUBLIC HEALTH

## TB Major Problem Among Merchant Seamen

► TUBERCULOSIS IS a major problem among seafarers, an expert committee sponsored jointly by the World Health Organization and the International Labor Organization reports.

Crowded living conditions on board ship favor the spread of the disease. So do long voyages during which adequate treatment is not available. Visits to ports where there may be much more than the average amount of tuberculosis also favor its spread among seamen.

For these reasons, the committee recommended that all new men entering the merchant marine should be examined for tuberculosis, and that everything possible should be done to prevent their going to sea until the results of the examinations show they do not have TB.

Periodic reexaminations and rehabilitation of tuberculous seamen so they can return to the sea or to other work were further recommendations of the committee.

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and red-sensitive plates, in immediate succession. Some features are present only on plates sensitive to one of these two colors.

The atlas, to be issued in three or four annual sections beginning next year, is the result of the National Geographic Society-Palomar Observatory Sky Survey. Mount Wilson and Palomar Observatories are jointly operated by the Carnegie Institution of Washington and the California Institute of Technology.

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## PUBLIC HEALTH

# Psittacosis Breaks Out

Workers in Texas processing plants for turkeys have been hit with parrot fever four times so far this year. Prior to antibiotic treatment, this lung disorder was a killer.

► THE ARMY has turned down two car-loads of turkeys from Texas because of a dangerous disease in the plant that processed them, SCIENCE SERVICE has learned.

The disease is psittacosis, or parrot fever.

Two Army inspectors are now sick with parrot fever caught when they inspected turkey processing plants in Texas.

So far this year there have been four outbreaks of the disease among workers in turkey processing plants in Texas. In one week, the last in May, 97 cases of the disease were reported from Texas to the U. S. Public Health Service. This is more than three times the number reported from Texas the previous week. From 10 other states, 12 cases were reported the last week in May.

Psittacosis is a lung disorder, something like pneumonia or influenza. It was a killer before the discovery of antibiotic drugs, or so-called mold remedies of the penicillin class.

So far this year there have been no deaths from it, but the disease has been severe and there have been relapses in patients treated with antibiotics.

Psittacosis from turkeys is a much more severe disease than psittacosis from parrots or parakeets.

The disease gets its names, psittacosis and parrot fever, because it was first discovered in parrots and birds of the parrot, or psittacine, family, such as love-birds, parakeets and the like. It has, however, also been found in pigeons, canaries and chickens as well as turkeys. Scientists call this non-parrot form ornithosis, from the Greek word for bird.

The disease is caused by a virus. Humans get it from contact with sick birds and from dust that gets contaminated with the virus.

The first outbreak in a turkey processing plant occurred in Texas, in 1948, it is believed, although health authorities were not able to get very complete evidence on this outbreak.

Questions health and veterinary authorities would like answered are:

1. Is the disease occurring unrecognized in turkey processing plants in other states? The assumption is that if there were many cases, they would be recognized, however.

2. Can housewives, cooks or others handling carcasses of diseased birds get psittacosis? This is considered possible but not likely to be frequent.

3. Can regulations be made or enforced to clean up the situation at the source, that is, the diseased flocks? Department of Agriculture authorities say this would be difficult because it would mean inspection of all

flocks in Texas, and because it is hard to distinguish psittacosis from air sac disease in post mortem examination of the fowl.

The Food and Drug Administration has power to act if it can be proved that turkey meat from diseased birds is being shipped in interstate commerce. From a practical standpoint, this also would be difficult. The birds when shipped are usually eviscerated.

Detecting the virus in them would depend on bits of lung tissue being left in the birds, since that is where the virus primarily lodges, or on the possibility of finding the virus in the liver. Food and Drug authorities have learned that the virus was found still alive in turkey livers after the fowl and livers had been frozen for 21 days.

Fourth puzzling question is why has the disease struck in Texas? Other states produce turkeys and have turkey processing plants, but apparently no psittacosis in the birds or humans handling them. One guess, but it is only a guess, is that Texas turkeys caught the disease from infected parakeets slipping across the border from Mexico.

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## PHYSICS

# Sun-Powered Battery

► A SUN-POWERED battery has successfully changed light to electricity using a crystal of cadmium sulfide, the yellow powder used as a pigment in paint.

This development has been announced by the Air Research and Development Command. The cadmium sulfide crystal, about the size of a sugar cube, was tested at the Wright Air Development Center, near Dayton, Ohio. A solar battery using silicon as the light-to-energy converter was recently developed by Bell Telephone Laboratories. (See SNL, May 1, p. 278.)

Conversion powers of the miniature generator are so great that a wafer-thin slab four feet by 15 feet will supply enough current to operate lights and all other electric appliances for an average house 24 hours a day. The crystal, ARDC suggested, could be built into the roof of a house.

Attached to opposite sides of the crystal are electrodes, or terminals, one of silver and the other of indium. A wire running from the positive electrode to a motor or battery and back to the negative electrode forms the circuit to make the solar generator.

Amount of power is determined by the area of the electrode attached to the crystal. In the first model, a contact area one-eighth-

## • RADIO

Saturday, June 26, 1954, 3:15-3:30 p.m. EDT

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Father Francis Heyden of the Society of Jesus, astronomer at Georgetown University, Washington, D. C., will discuss the total eclipse of June 30.

## PSYCHOLOGY

## Soviet Psychologists at International Meeting

► SOVIET RUSSIA had four representatives at the XIV International Congress of Psychology meeting in Montreal.

Three of the four delegates presented papers at a session devoted to recent advances in psychological conditioning. Conditioning has particular interest to Russian psychologists because the pioneer in the field, Ivan Pavlov, was a Russian. He died in 1936 but his work has tremendous prestige in the U.S.S.R. Pavlov's ideas have been approved officially by the Soviet government. (See p. 398.)

The Russian psychologists were Dr. E. N. Sokolov of Moscow University; Dr. E. A. Asparajan of the Academy of Sciences of the U.S.S.R.; Dr. B. M. Teplov of the Academy of Pedagogical Sciences of the U.S.S.R. and Dr. A. B. Zaporozhets of Moscow.

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inch square produced one-third of a volt. The power output could be doubled or tripled, according to Donald C. Reynolds and Lt. Col. Gerard M. Leies of Wright Air Development Center.

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## ZOOLOGY

## Rats and Guinea Pigs Make Inaudible Sounds

► LABORATORY RATS, guinea pigs and several other animals besides bats and porpoises produce inaudible, or high frequency, sounds, Dr. John W. Anderson of Cornell University, Ithaca, N. Y., has discovered.

The other animals are the flying phalanger, squirrel monkey, cotton-headed marmoset, white-armed marmoset, lion-headed marmoset and Kina Balu giant rat.

The high frequency sounds may serve for communication between individual rats, Dr. Anderson thinks. Whether or not rodents use these for orientation as bats do is not known. Details of his findings, some of which were made at the National Zoological Park in Washington, are reported in *Science* (June 4).

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## MEDICINE

# Diet for Jaundice Patients

**Prisoner volunteers given viral hepatitis prove that jaundiced patients should be allowed to eat what they like, rather than be kept on high-protein diet.**

► JAUNDICED PATIENTS suffering from the liver disease, viral hepatitis, should be allowed to eat what they like. They will do better, have fewer complications and get well faster.

Some may even be saved from death.

This reverses the diet treatment usually prescribed for such patients.

Since diet is the only treatment doctors have for hepatitis, this revolutionary idea, proved by a Public Health Service study with prisoner volunteers, is particularly important for the thousands of patients afflicted by this increasing and serious sickness.

The Public Health Service study is the first completely controlled study ever made of diet in hepatitis. The findings were reported by Drs. N. C. Leone, Frank Ratner, William C. L. Diefenbach and Roderick Murray, and Miss Miriam G. Eads, dietitian, and Jacob E. Lieberman, statistician, of the National Institutes of Health, Department of Health, Education and Welfare, to the New York Academy of Sciences.

The usual diet for patients with viral, or serum, hepatitis has been high in protein, such as meat, eggs, cheese and so on, high in starches and sweets, and low in fat. Patients got jam instead of butter on their bread, boiled instead of fried eggs, coffee, tea and breakfast cereal without cream, and so on. They were forced to eat lots of protein, though they had no appetite.

They were given extra protein by injections of special protein preparations for vein feeding.

This diet developed from findings of a relation between diet and certain types of liver injury in laboratory animals. Whether or not it helped human patients with viral hepatitis was not definitely known. For one reason, no one has ever been able to give this disease to a laboratory animal for experimental study of it.

For another, diagnosis of the disease is not always made at its start in humans and it lasts so long, often many months, that accurate diet studies have been difficult.

Dr. Leone and associates got around these difficulties by making studies on prisoner volunteers who were deliberately given hepatitis. The doctors knew the health of the men before the start of the study. They knew about when they would first come down with pre-jaundice symptoms of weight loss and a little nausea.

When this stage was expected, the human guinea pigs were examined every day and at the first sign of illness, certainly at the beginning of the acute, really sick and jaundiced stage, the prisoners were put in the hospital and the diet study begun.

Of 67 volunteers, 32 were put on a "special diet," the high-protein, high-carbohydrate, low-fat diet that has been practically standard for serum hepatitis patients for some years. The other 35 were in an "ad lib" group, eating what they wanted of the food provided for the general institution population. If they wanted more or less of some food, they could have it.

Duplicate meals of everything eaten by each patient in each group were made up. These were weighed and analyzed chemically, so the doctors knew exactly how much of each kind of food the patients actually ate.

A dramatic change in eating by the "ad lib" group occurred during the acute stage of the illness. This actually marked the end of the acute stage. The patients suddenly developed voracious appetites and started eating more than those on the forced high protein diet were eating. The change was very sudden.

A patient might be sick in the morning, but that evening so hungry he could not get enough to eat.

Apparently this was the point at which the sick liver had regenerated itself and could handle quantities of food chemicals again. Trying to load the liver when half of it, perhaps, has been knocked out by the disease is ridiculous, in Dr. Leone's opinion. The sick liver should have rest. And the results of the study bear this out.

Of patients on the special, high protein diet, 18 were very sick, had relapses and complications, took a long time to get well, and four went into coma and one died. Among the patients on the "ad lib" diet, there were no deaths and none going into coma and only seven that had relapses or prolonged illness.

Both chemical tests of liver function and examination of the patients showed that those on the "ad lib" diet had a shorter period of acute illness and recovered faster when the acute stage was over.

The human guinea pigs for this study were prisoners volunteering for it at U. S. Penitentiaries at Lewisburg, Pa., and McNeil Island, Wash.

Dr. Leone and associates gave them hepatitis in one of four ways: 1. by pooled blood plasma known to have the serum hepatitis virus in it; 2. by the same plasma that remained in infective after treatment by various methods intended to make it non-infectious but which failed; 3. by plasma from six suspected carriers of the hepatitis virus, five of whom were later proved to be carriers; and 4. by blood thrombin from a commercial batch reported to have caused hepatitis cases.

Some of these infecting materials made the men sicker or made the sickness slower in developing. However, once they got hepatitis, the high-protein diet made it worse.

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## METEOROLOGY

## Precipitation Forecast Next Computer Problem

► FORECASTING RAIN or snow is the next problem meteorologists will attack, using giant electronic "brains." Weathermen assembled for a workshop on Numerical Weather Prediction, as using computing devices to aid forecasting is termed, know that electronic "brains" can show wind flow and pressure patterns.

This, however, Dr. Jule Charney of the Institute for Advanced Study, Princeton, N. J., pointed out, is not "weather as it affects you and me." The local forecaster must judge on the basis of these charts whether rain or clear skies are on their way. And weathermen know that there is no simple relation between wind flow and where and how much rain or snow falls.

As Dr. J. Smagorinsky of the U. S. Weather Bureau said, wind flow is a large-scale effect, whereas in forecasting precipitation, small-scale effects are dominant. Being able to forecast these small-scale effects accurately is the problem numerical weather prediction experts are now tackling.

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## INVENTION

## Patent Given Pointless Pen

► A MINOR tremor was felt in the Patent Office when a pointless, ball-less "writing instrument" that may start another shake-up in the fountain pen business was granted a patent. Created by a Parker Pen Company employee, Ernst W. Rickmeyer, the device has a cone-like tip made of sintered metal.

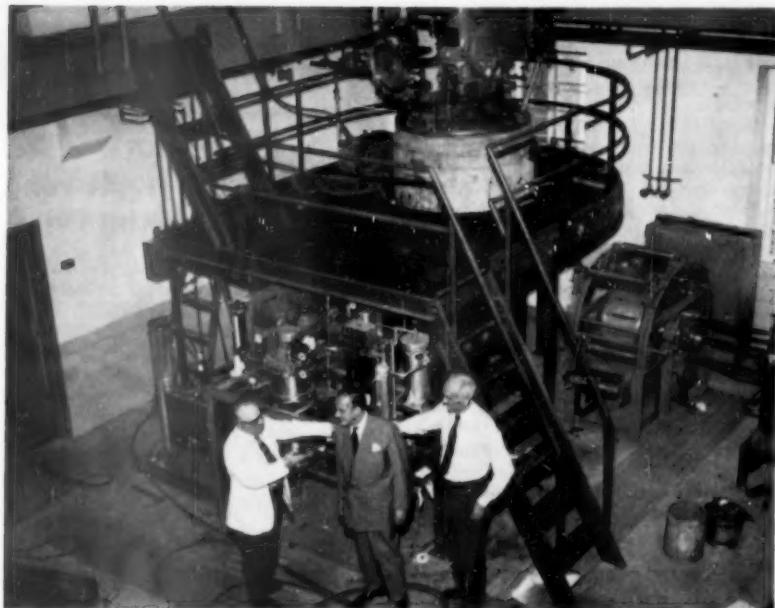
Tiny capillary holes in the tip permit the thick ink to filter through and rub off on the writing surface. The pen doesn't leak when not in use, nor does it need to be shaken violently or rolled over scratch paper to get it started after long disuse. A special feeding system permits all the ink to be consumed before another cartridge is needed.

"As of the moment, this pen is just a new idea," A. R. Roalman of the Parker Pen Company said.

"The boys are just fiddling around with it in the laboratory. They say it is good enough to patent, but they must get some bugs out of it before we can market it."

It is too soon even to predict whether the pen will be manufactured at all, Mr. Roalman reported. At the earliest, it probably will not make a commercial debut for several years. Patent No. 2,666,416 was assigned to Parker for the pen.

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**MICROBIOLOGICAL INSTITUTE**—Dr. Selman A. Waksman, left, director, shows a visitor around the pilot plant room of the new Rutgers Institute of Microbiology. The visitor is Dr. O. Hubner of Copenhagen, Denmark. At the right is Dr. Adolph Zimmerli, honorary professor of microbiological engineering, in charge of proposed mass production experiments.

#### BIOLOGY

## Institute for Tiny Giants

Microbes such as those that produced a giant among disease conquerors, streptomycin, will be studied in laboratories financed by that discovery.

► SOME OF the world's smallest living things have a new research institute devoted to them.

The new laboratories of the Institute of Microbiology at Rutgers University, costing approximately \$3,500,000, have been financed by royalties earned by discoveries used in man's medical warfare against infectious diseases, principally tuberculosis.

Dr. Selman A. Waksman, Nobelist in medicine and physiology in 1952, is not only the builder and scientific spirit of the Institute, but is the scientist whose research brought about the discoveries in antibiotics that have made the Institute possible. The greatest of Dr. Waksman's discoveries to date has been streptomycin.

This "wonder drug" was isolated in September of 1943. However, the work which made its discovery possible had been under way in Dr. Waksman's laboratory at the College of Agriculture, Rutgers University, since 1915, when he undertook a comprehensive study of actinomycetes in soil.

This long and valuable work was aimed at specific agricultural and industrial prob-

lems linked with microbes in the soil, their role in the decomposition of plant and animal residues in nature, their activities in the production of composts, in providing the necessary nutrient for the growth of mushrooms, in the manufacture of enzymes, in the production of sulfuric acid, in the attachment of fouling organisms to ships' bottoms, in destroying steel pipes and other valuable industrial products.

Underlying all work in antibiotics is the discovery by early investigators that certain microbe varieties could destroy others.

Dr. Waksman had formally explored this phenomenon in its application to human disease in 1932 when, under a grant from the National Tuberculosis Association and the National Research Council, he undertook to study the fate of tuberculosis germs exposed to the action of the microbes present in soils and in water basins.

He also made a detailed study of the interrelationships of microbes in the soil and, as expressed by a famous university president, "led microbes in battle against one another."

In 1939, he sharply altered the line of his former investigations and set to work on the isolation and development of microbial species that would aid treatment of infectious diseases in man and animals.

His early experience with salvarsan, the "magic bullet" of Ehrlich, gave him a background for this point of view. The outbreak of war helped make his decision, as did the success of a former student and protege, Dr. René J. Dubos of the Rockefeller Institute, in developing tyrothricin.

Dr. Dubos, who came to the U. S. from France and was trained at Rutgers under Dr. Waksman, contrived the unbelievable feat of actually training a microbial strain to exist on pneumonia germs as food. This resulted in the isolation of *Bacillus brevis*, which produced in the laboratory gramicidin and tyrocidine, combined under the name of tyrothricin.

Dr. Waksman set himself two specific problems. One was to find microbes capable of destroying pathogenic (dangerous) microbes without harmful effects upon the tissues of the host, namely the human and animal body. The other was to find microbes with the power to produce antibiotics that were capable of interfering with the growth of and destroying the hard, waxy, water-repellent, walled microbe that causes human tuberculosis.

Penicillin was rediscovered in England during the progress of these experiments and showed great power against some of the major disease germ enemies of mankind. One of streptomycin's early predecessors of the same general family, namely streptothricin, showed promise in affecting the half of the microbial population, the gram-negative organisms, that penicillin did not touch.

From the beginning of his work in 1915, Dr. Waksman had taken particular interest in a variety of microbes known as actinomycetes. His work with this particular group of organisms is probably one of the longest continued investigations by a single individual upon a research project.

When his new line of investigation began, he quite naturally used as laboratory material those organisms upon which he had worked so long. Back in 1915, he and R. E. Curtis, an assistant of Dr. Jacob Lipman, isolated from several soils an organism which they identified as *Actinomyces griseus*. From a strain of this organism, now known as *Streptomyces griseus*, came the miracle drug streptomycin.

A year after the work on antibiotics began in 1939, the first important result evolved. It was actinomycin, derived from one of Dr. Waksman's old friends the actinomycetes, an organism named *Actinomyces antibioticus*.

It had remarkable properties to destroy microbes, but was almost as efficient at destroying living animals. Although actinomycin could reduce the size of the spleen, which led recently to the study of its effect in Hodgkin's disease, it was put aside because of its toxicity.

## ZOOLOGY

**"Cold-Blooded" Animals Grow Faster in Cold**

► "COLD-BLOODED" animals, such as sea snails, may not be so cold-blooded after all. Some of them grow faster in cold water than in warm water.

Dr. Paul Dehnel, University of California at Los Angeles zoologist, points out that coldbloods, in the zoological sense, are those animals that cannot adapt readily to temperature changes. A lowering of temperature limits body activities considerably.

The U.C.L.A. zoologist has found that at least one coldblood, the sea snail, may even step up his body activities because of the cold. This was suggested when he observed that sea snails grow faster and achieve adulthood sooner in Alaskan waters than they do in southern California waters.

There are certain times of the year when Alaskan waters are so cold that body activities of all types are curtailed and growth suspended. So the sea snail apparently speeds up activity during the "growing season," and thus reaches adulthood far ahead of his southern brethren.

The adult Alaskan sea snail does not get any larger than the southern California variety. However, other types of marine animals do. This points to the conclusion that the "longitude" of some fish is a function of the latitude.

Science News Letter, June 19, 1954

## AERONAUTICS

**Officer Survives Sled "Bailout" Test**

► AN AIR Force officer has survived a test in which he was rocketed at 421 miles an hour in a railroad-like sled, and brought to a stop so suddenly that his 180-pound body would have registered 3,960 pounds on spring scales.

Lieut. Col. John Paul Stapp, chief of the aero medical field laboratory at the Holloman Air Development Center in New Mexico, experienced 22 g's during the test. This is 22 times the normal pull of gravity on the body.

Col. Stapp has conducted the human deceleration program several years for the Air Force. The current series of tests is aimed at finding out what would happen to a pilot if he were forced to bail out at supersonic speeds.

This first test was made in a specially designed sled which roared down extra-heavy railroad track. It was pushed by a second sled powered by six rockets, each capable of generating 4,500 pounds of thrust.

It was stopped suddenly by a scoop mechanism that dipped into a trough between the rails, channeling water into the sled and spewing it out in a powerful jet-like stream.

Future tests will check the effects of tumbling, wind blast and deceleration on volunteers. But the tumbling tests will not be made until full information on maxi-

mum speed runs has been obtained. The tumbling tests will be conducted in a special chair attachment for the sled which rotates the subject head over heels 180 times a minute.

The sled can be powered by a maximum of 12 rockets which are capable of carrying a 200-pound man 800 miles an hour—faster than the speed of sound. At the 4,092-foot elevation of the Holloman Air Development Center, ground speeds of 800 miles an hour are equal to 1,800 miles an hour at a flying height of 40,000 feet.

Science News Letter, June 19, 1954

## ARCHAEOLOGY

**Survey Started On Catalina Island**

► THE FIRST systematic archaeological survey of Catalina, California's famous island playground, is now being made by Dr. Clement Meighan, E. V. Winans and J. C. Hurst, archaeologists at the University of California at Los Angeles.

Although the island resort is known to contain an abundance of Indian relics, no one has attempted to find out about the Indians who inhabited the island before the first Spanish "tourists" came in 1542.

Among the initial discoveries is an ancient soapstone quarry from which the Indians carved stone dishes, tools and ornaments. Also found were the remains of what appeared to be a primitive dwelling. The dwelling site is located on a bluff which affords a scenic view of Catalina channel with the Palos Verdes Hills and San Gabriel Mountains as a backdrop.

A hollow rock in which the Indians had carved out a chimney was found below the quarry. Although it is similar to a backyard incinerator in appearance, the archaeologists surmised it might have been used to bake food.

Science News Letter, June 19, 1954

## VETERINARY MEDICINE

**Bossy Gets Own De-Lousing Gadget**

► A DE-LOUSING gadget that cattle can operate themselves, thus saving the farmer and rancher much time in spraying and dipping, has been devised by entomologists of the U. S. Department of Agriculture.

The gadget consists of burlap-wrapped wire stretched from the top of a five-foot post and anchored to the ground nine feet from the base of the post. The burlap is treated with about a gallon of five percent chlordane oil solution.

Tests showed the device both effective and safe, since it proved impossible for cattle to overdose themselves by rubbing against it. The government scientists believe it should be especially useful for northern cattlemen who live where cold damp winters make spraying or dipping the animals undesirable.

Science News Letter, June 19, 1954

## IN SCIENCE

## VETERINARY MEDICINE

**Modern Cow Highstrung And Needs Special Care**

► THE IDEA that a cow is a placid animal is all wrong, it appears from a report from the American Veterinary Medical Association in Chicago.

"The modern dairy cow is such a high strung milk producing machine that she needs special care to remain in high production," association officials declare.

Otherwise she may get ketosis, a "stress" disease caused by an upset of the metabolic balance of high producing cows. The disease usually develops five to 80 days after calving.

Several factors may act as the "trigger" to touch off ketosis cases. Improper feeding and management, lack of exercise, feed deficiencies, fatigue, exposure, infectious diseases and digestive upsets, all may lead to ketosis.

Cows affected with ketosis show a slow drop in milk production, rapid loss of weight, loss of appetite and nervous symptoms. Treatment is aimed at restoring the hormonal and metabolic balance of the cow's system. New hormone drugs have been used successfully to speed recovery of stricken animals.

Science News Letter, June 19, 1954

## INVENTION

**Patent Gasoline Engine With Hour-Glass Shape**

► A GERMAN automotive engineer has patented a new gasoline engine designed to eliminate knocking by improved combustion and reduce repair bills by easier valve grinding.

It has a roughly hour-glass shape and was invented by Rudolf Kosche of Stuttgart.

A small circular passage connects the hemispherical combustion chamber with the cylinder space below it. In cross-section, the design looks as if the cylinder had been constricted between the top of the piston and the sparkplug.

The two valves are set in the sides of the combustion chamber with concave heads matching the spherical shape. When the top of the engine is removed, the combustion chamber and valves are immediately accessible for repair.

Mr. Kosche claims that this radical design greatly improves the firing of gasoline and the exhausting of spent gases. Knocking in automobile engines is usually caused by delayed or incomplete combustion of the fuel.

The engine patent was assigned to the Daimler-Benz firm in Stuttgart and received patent No. 2,672,135.

Science News Letter, June 19, 1954

## SCIENCE FIELDS

## MEDICINE

**New Rash and Fever Disease of Children**

► DISCOVERY OF a new rash and fever disease that is "catching" and afflicts children is announced in the *Journal of the American Medical Association* (June 5).

Doctors in Massachusetts reported seeing 2,450 cases within one three-month period. Most of the cases occurred in and around Boston and most were in children 10 years or younger. The few grownups who got the disease had "shaking chills" as well as fever.

Fortunately the disease is not serious and patients recover in a few days. It is like German measles except swollen glands in the neck, typical of German measles, are not often seen in this new disease. It comes at a different time of year from German measles, too. It has not yet been given any name.

A virus believed to be the cause has been isolated.

The new disease was discovered by doctors in the Boston area in the late summer of 1951. No cases were reported in 1952, but cases appeared again in 1953. The disease may have occurred in epidemics elsewhere but been mistaken for German measles.

Report of the 1951 outbreak and of the isolation of the virus are given by Drs. Roy F. Feemster and Ilse J. Gorbach of the Children's Medical Center and the Massachusetts Department of Public Health, Boston, and Dr. Franklin A. Neva, now at the University of Pittsburgh School of Medicine, Pittsburgh.

Science News Letter, June 19, 1954

## MEDICINE

**Hormones Might Stop Ruptured Spinal Disc**

► RUPTURED DISCS, cause of severe, often disabling backache and sciatic pain in the leg, might be prevented by hormone treatment, Dr. Barnes Woodhall, professor of neurosurgery at Duke University Medical School, Durham, N. C., declared at the meeting of the American Orthopedic Association in Bretton Woods, N. H.

Abnormal chemical changes probably destroy the disc before it ruptures, Dr. Woodhall stated. The hormone treatment might stop this degenerative process before the rupture actually occurs, he suggested. His theory is based on study of 1,000 cases picked at random from more than 2,200 operations on ruptured discs at Duke during the past 17 years.

A disc is made up of a dense tissue framework imbedded in a mass of specialized

tissue that contains sugars (mucopolysaccharides), water and salts.

As a person grows old, Dr. Woodhall explained, the salts gradually decrease, and there is a corresponding decrease in water content.

Admitting many unsolved problems in the chemistry of the sugars, he said, clinical studies recorded during aging suggest that changes in these components of the human disc may be present in the interspace tissue preceding acute disc rupture.

In discussing the cases, the Duke neurosurgeon said that more than 95% of the ruptured discs occurred at one of two spaces in the small of the back. Some eight percent had a recurrence of rupture, usually in the same space as the previous one.

"Observed changes in acid mucopolysaccharide content imply marked alterations in the regular lattice framework of the ground substance of the disc, perhaps initiated by trauma or pressure, and perhaps leading to acute disc failure or rupture," he said.

Science News Letter, June 19, 1954

## PSYCHOLOGY

**Local Brain Damage Causes Vocabulary Loss**

► WHEN OLD people suffer from the mental deterioration known as senile dementia, they have a vocabulary superior to their intelligence as shown by non-language tests.

This pattern of vocabulary superior to retained intelligence is associated with a diffused damage to the brain, Prof. Pierre J. Pichot, of Paris, told the meeting of the XIV International Congress of Psychology in Montreal.

When such old people also lose their ability to use and understand difficult words, it is because in addition to the mental deterioration of old age, and superimposed on it, there is a latent aphasia, or word blindness, which is associated with localized brain damage such as might be caused by epilepsy, Prof. Pichot said.

This possibility should be kept in mind in the practical use of the so-called mental deterioration scales which depend upon the relation of vocabulary superiority to retained intelligence level.

Science News Letter, June 19, 1954

## AERONAUTICS

**Airborne Radar for Commercial Airlines**

► AN AIRBORNE radar enables commercial pilots to see instantly the position, intensity and extent of storms as far as 150 miles ahead.

The equipment, developed by Bendix Aviation Corporation, can also survey the terrain. Landmarks, such as rivers and coastlines, are often important to navigation when flying "blind."

Commercial production of the units will begin this fall.

Science News Letter, June 19, 1954

## PSYCHOLOGY

**Suggested as Model: Alcoholics Anonymous**

► ALCOHOLICS ANONYMOUS could serve as a pattern to make group therapy in prisons more effective, Dr. Donald Cressey, University of California at Los Angeles criminologist, has suggested.

"Most so-called group therapy in prisons is largely individual psychotherapy simultaneously administered to a number of persons," he declared. "Criminality is 'treated' clinically as if it were a disease, like syphilis.

"Much time is spent in allowing the participant to ventilate suppressed hostility. This supposedly enables him to get rid of individual emotional disorders responsible for his criminality.

"Any value gained from group participation is offset when fellow inmates not in the group ridicule a participant's newly acquired 'Square John' attitude and guards show distrust of his reformed demeanor."

In Alcoholics Anonymous, the participant immediately acquires an intimate membership in a network of group relations explicitly utilized to reform him, Dr. Cressey points out. His belligerence is reduced quite incidentally. If the program is initially successful, he gains status in the group. His new attitudes are reinforced as the "reformee" becomes the "reformer."

"Prison group therapy should develop and sustain anticriminal values among inmates as Alcoholics Anonymous does with anti-alcoholism among its participants," Dr. Cressey concluded.

Science News Letter, June 19, 1954

## PEDIATRICS

**Hormone for Babies May Cause Sterility**

► GO SLOW on the use of male hormones for the treatment of small, underweight babies. It may cause sterility later in life.

Studies by scientists at the University of California at Los Angeles Medical School and Rutgers University showed that when five-day-old mice were injected with male sex hormones, complete infertility resulted later in adulthood. In 10-day-old mice some infertility also resulted. A five-day-old mouse is at about the equivalent stage of development as a one-year-old human baby.

Male hormones have been used to treat several conditions in infants. For example, it has been found that premature infants, considerably underweight, may be brought up to normal weights through use of male hormones.

While the experimental results with mice may not be directly applicable to human beings, the scientists feel they are significant enough to warrant extreme caution in the use of male hormones during formative years.

The studies were made by Dr. Charles Barracough, U.C.L.A. Medical School, and Dr. James H. Leathem of Rutgers.

Science News Letter, June 19, 1954

## ASTRONOMY

# Total Eclipse on June 30

**Moon's shadow, rushing across earth's surface at 3,000 miles an hour on June 30, will be used to check the distances between special observing sites set up in totality path.**

By ANN EWING

► WHEN THE moon's shadow of the total eclipse on June 30 rushes across the world, Russia included, its arrival will be clocked to aid in measuring distances more accurately than by any other method now in general use for mapping long distances.

The U. S. Air Force is financing eclipse expeditions of American astronomers to several major sites in the path of totality.

The rushing moon's shadow can be likened to an express train whose speed is known traveling past stations whose distances apart are unknown. These stations are sites of the Air Force's expedition parties, spanning the mainland of North America and Europe.

They stretch from James Bay, Ontario, to Iran, and include Knob Lake, Quebec; the Okak Islands off the coast of Labrador; Greenland; Iceland; the Faeroe and Shetland Islands; Koster Island and Lyckas, Sweden; and Bandar Shah, Iran.

### Distance Measuring Method

Since the speed of the moon's shadow is known fairly accurately, if its arrival at these stations is precisely timed, the distance between the stations can be computed. Three methods will be used to get the exact timing:

1. In the Bonsdorff method, the crescents of the sun as the moon passes across it are directly photographed.

2. The Lindblad method also uses photography to show the flash, or reversed spectrum, caused by light from the sun's outer envelope, and visible only at the very beginning and end of a total eclipse.

3. The Gaviola method measures the decreasing light intensity as the moon shuts out the earth.

In addition to intercontinental distance measurements, many of the eclipse expeditions will make new and painstaking tests to determine whether light rays from certain stars are bent as the rays pass near the sun on their way to earth, as predicted by Einstein's general theory of relativity.

A total eclipse of the sun offers the only chance to make this test, as ordinarily the light of the stars in the same direction as the sun is drowned out by the sun's glare.

Dr. Edwin Finlay-Freundlich of St. Andrews University Observatory, Scotland, has recently found that this bending of light toward the sun is 30% higher than had been thought. He will go to Sweden for eclipse observations that should show whether this disagreement is real.

Practically everyone in the United States east of the Rockies will be able, weather permitting, to see at least a partial eclipse early in the morning on June 30. For those who are planning early summer trips, the rare and beautiful spectacle of the totally eclipsed sun is well worth driving a few hundred miles to the totality path to see.

A booklet on the eclipse, including a map showing the exact eclipse path, is available for 40 cents from the U. S. Naval Observatory in Washington, D. C.

### Path of Totality

Sweeping along at 3,000 miles an hour, the moon's shadow will touch the earth first in northeastern Nebraska at sunrise. It then rushes northeastwardly, crossing southern South Dakota and the extreme northwestern corner of Iowa into Minnesota, northern Wisconsin and the upper Peninsula of Michigan.

Dr. E. M. Brooks of St. Louis University has predicted that the best spot in the U. S. for viewing the total eclipse is Minneapolis. From study of past Weather Bureau records, he found that the early morning sky is less often overcast there than elsewhere along the totality path in North America.

Nevertheless, the chance that the eclipse will be visible from Minneapolis is only about 50%, but it is even less than that at

other spots along the totality path on this side of the Atlantic Ocean.

No reliable weather forecast for June 30 will be available until just a few days before the date. There are as yet no known plans for a live television show of the eclipse, but at least two networks expect to present movies of the heavenly show later in the day.

### Spans Two Continents

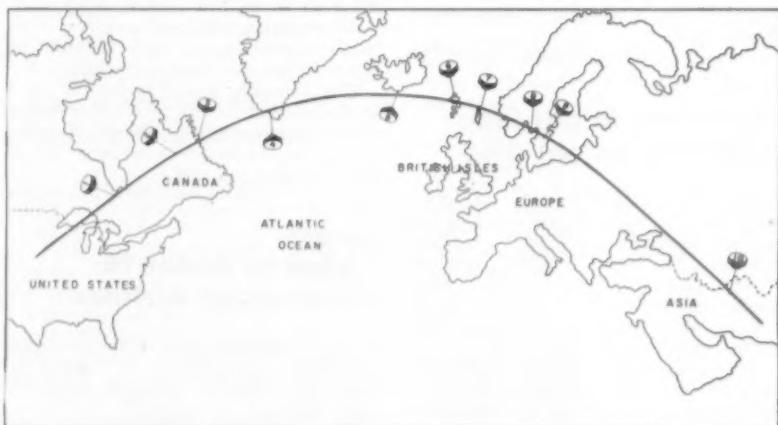
Many persons besides astronomers will be interested in a weather forecast, for the eclipse will be visible in the early morning as a partial dimming of the sun's light over most of the land areas of the Northern Hemisphere, except for western North America and the eastern part of Asia. Not until 2151 will there again be another total eclipse whose path spans both North America and Europe.

The path of totality of this eclipse, from its first contact with the earth at sunrise in Nebraska to its last contact at sunset in India, unlike the greater number of total solar eclipses, passes over more land than water.

Weather permitting, more people will view this eclipse than any previous one: Nearly one-third of the world's population will see at least a part of the sun blacked out, and about 2,000,000 live in the totality path.

The closer a person is to the path of totality, the greater is the part of the sun that will be covered by the moon.

For a table listing the times of the partial eclipse for a few typical places in the United



**ECLIPSE OBSERVATION SITES**—Major sites for observing the June 30 total solar eclipse under Air Force sponsorship are shown on this map. The black line indicates the path of totality, about 80 miles wide, inside which scientists will make the most comprehensive eclipse study in history. The partial eclipse will cover most of the U. S., Canada, all of Europe and much of Asia.

States, and the percentage of the sun's diameter that the moon will cover, see SNL, May 22, p. 330.

Besides the Air Force sites, other expeditions will use the very short period of totality to make observations that have been in the planning stage for two years or more:

In the U. S., an expedition sponsored by the National Geographic Society will explore the mysteries of the zodiacal light while the sun is in total eclipse below the horizon. Using photoelectric scanners, scientists will try, for the first time, to spot the wedge-shaped finger of light that is seen rising vertically from the horizon at twilight and dawn. It is believed to be caused by sunlight reflected from meteoric material concentrated within the earth's orbit. This expedition to Nebraska and Colorado sites will be headed by Dr. George Van Biesbroeck of Yerkes Observatory, Williams Bay, Wis.

The path of totality, after leaving North American shores over Labrador, crosses Greenland, Iceland, the Faeroes and Shetland Islands, southern Norway and Sweden, Russia, Iran, Afghanistan and Pakistan to its ending at sunset in northern India.

In Sweden, under the auspices of the California Academy of Sciences, C. P. Butler and Leon E. Salanave will try to learn more about the mysterious shadow bands that ripple across all light-colored surfaces on the ground as the moon's shadow approaches.

Cause of the shadow bands is not known, but the two scientists hope to check the bands' speed with two photoelectric eyes set up 300 feet apart.

Also set up in Sweden, at Oskarshamn on the east coast, will be radio telescopes as

well as optical instruments of the Naval Research Laboratory in Washington. Rain or cloudy weather will not interfere with the radio observations, under the direction of Dr. John P. Hagen, which will be aimed at studying the effects of the sun's outer envelope on the sun's radio radiations.

From the North American coast to Iceland, the totality path crosses the auroral zone. Taking advantage of this unusual occurrence, scientists in Royal Air Force planes will try, for the first time, to spot the aurora during the daytime. They will fly above any clouds, and hope to confirm that northern lights, usually hidden by the sun, not only shine during the day, but are brighter during the day than at night.

## Don't Look at Sun Without Eye Protection

Do not, at any time, try to look at the sun without protection for your eyes. Even during a partial eclipse, the sun's glare is still brilliant enough to injure the delicate eye membranes.

Use several layers of overexposed photographic film or a piece of very densely smoked glass when looking at the sun, whether or not there is an eclipse.

Because of widespread public interest, every solar eclipse takes its tragic toll of vision. Sunglasses, and even welder's goggles, do not give adequate protection. Most "dark glasses" let 80% or more of the light through, and are totally inadequate for looking at the sun.

Always protect your eyesight, never look directly at the sun.

Science News Letter, June 19, 1954

### NUTRITION

## World Food Supply

THE WORLD food supply could be easily doubled through modern engineering and agricultural technology, Lord Boyd-Orr, Nobel prize winner and famed British food authority, declared in a report to the Nutrition Foundation.

The doubling of the food supply will be needed within the next 25 years if the anticipated increased numbers of people in the world are to be fed enough food of good enough quality to maintain full health and vigor.

How this might be done and what it would mean are described by Lord Boyd-Orr as follows:

"Soil erosion which is believed to have destroyed or damaged about half of the original fertile areas of the earth would need to be halted by vast forestation projects on every continent and the destructive force of river floods converted by projects like the T.V.A. to hydro-electric power and irrigation. Deserts once fertile would need to be reconditioned.

"These projects, some of which are already being carried out in different parts

of the world, together with the need for millions of tractors and other agricultural equipment to modernize primitive agriculture, and the setting up of the necessary secondary industries for the maintenance of equipment and road and rail means of transport for food, would demand enormous quantities of industrial products.

"Then, as agricultural products increased, the enhanced purchasing power of the 60% of the families in the world engaged in agriculture would provide an expanding market for consumer goods.

"Thus a world food plan, based on human needs, would provide a greatly increased world market for industrial products. As the creation of wealth, in this case beginning with food, is a cumulative process, it would contribute to the rapidly expanding world economy which is needed to balance the growing industrial potential and also to take up the slack as rearmaments slow down, and so keep the wheels of industry turning with full employment and economic prosperity."

Science News Letter, June 19, 1954

## Eight New Items

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# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D.C. Request free publications direct from publisher, not from Science Service.

**CONFLICT AND MOOD: Factors Affecting Stability of Response**—Patricia Kendall—*Free Press*, 182 p., \$3.50. A study of what it is that causes shifts in public opinion or attitudes toward public questions.

**THE EMOTIONAL PROBLEMS OF CHILDREN: A Guide for Parents**—Harry Joseph and Gordon Zern—*Crown*, 310 p., \$3.75. Written in answer to requests for information. Parents often fear the problems of child raising, the authors explain, partly because with our children we relive our own childhood fears, phantasies and unresolved problems. Information will often dispel such fears.

**EPICS OF SALVAGE: Wartime Feats of the Marine Salvage Men in World War II**—David Masters—*Little, Brown*, 234 p., \$3.50. An authority on diving and salvage tells some romantic stories of the wealth recovered from Davy Jones' locker.

**FINGERPRINTS: Fifty Years of Scientific Crime Detection**—Douglas G. Browne and Alan Brock—*Dutton*, 260 p., illus., \$3.50. This book is intended for the lover of detective fiction. Although scientific crime detection with fingerprints is relatively recent, the Chinese for many centuries have used the Emperor's thumb print on state papers to insure authenticity. Prints were also used for signatures of illiterates.

**MAN ABOVE HUMANITY: A History of Psychotherapy**—Walter Bromberg with foreword by Winfred Overholser—*Lippincott*, 342 p., illus., \$5.75. A history of the attempt by man to help his fellows in distress, from the ancient medicine men and monks to today's specialists.

**NEW AND NONOFFICIAL REMEDIES: Containing Descriptions of the Articles Which Stand Accepted by the Council of Pharmacy and Chemistry of the American Medical Association on January 1, 1954**—Council on Pharmacy and Chemistry—*Lippincott*, 609 p., \$2.65. An innovation in this edition is a list of drugs omitted since the previous edition and a list of new drugs added.

**PRINCIPLES OF GENERAL ECOLOGY**—Angus M. Woodbury—*Blakiston*, 503 p., illus., \$6.00. Designed primarily as a college text, but intended also to be of interest to workers in the field and to laymen.

**THE SOCIAL FUNCTION OF ART**—Radhakamal Mukerjee—*Philosophical Library*, 280 p., illus., \$10.00. This interpretation of art by the head of the department of economics and sociology at the University of Lucknow, India, is illustrated by lovely Indian works of art.

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## MARINE BIOLOGY

### Breed Oysters for Special Characteristics

► **OYSTERS BRED** for special characteristics, as cattle, hogs and horses are bred, are now believed possible as a result of an experiment at the Virginia Fisheries Laboratory, Gloucester Point, Va.

Successful artificial spawning of oysters and their larval development to the setting stage under artificial conditions has been achieved by Dr. Jay D. Andrews, assisted by Dr. Victor L. Loosanoff of Milford, Conn. This is the first time this has been done in Virginia, Dr. Andrews reports.

Oysters that grow rapidly and reach maturity a year or two earlier than the average commercial oyster now does is one possibility foreseen by Dr. Andrews. Oysters bred to resist disease are another.

Biologists throughout the world have maintained that it is possible, through hybridization, to produce special oysters to meet special needs. Investigations leading to a solution of the many problems involved in producing oysters artificially are being made not only at the Virginia Fisheries Laboratory but at several other laboratories in this country and other parts of the world.

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## CLIMATOLOGY

### Redwoods, Volcanoes Once Covered Nevada

► **NEVADA TODAY** is a land of barren deserts and rocky mountains, but a geological survey shows that 14,000,000 years ago it was covered with redwoods and many volcanoes were active in the area.

Dr. Daniel Axelrod, University of California at Los Angeles geologist, made the survey.

Like flowers pressed between pages of a book, plant leaves pressed between masses of rock tell the story. From these fossil plants and the rocks in which they are found, Dr. Axelrod has been able to piece together an account of Nevada's distant past.

At that time, the Pacific Northwest was covered with hardwood forests like those of the Mississippi Valley today. Coastal southern California was covered with subtropical forests, and today's southern deserts were oak and pine woodlands.

During this era, Nevada had vegetation similar to that now found on the southwestern flanks of the Sierra Nevada where redwood and pines mingle with oaks and chaparral. The region had an annual rainfall of 25 to 30 inches. Drainage was westward to the ocean. Today most of Nevada drains into low areas within the state.

After the Sierra was formed, moist, westward winds, which carried rain to the Nevada area, were blocked. This and other factors caused the forests to die out and the region became a desert.

Science News Letter, June 19, 1954

## GENERAL SCIENCE

### Science Register Lists 215,000 by Mid-1955

► BY THE middle of next year Uncle Sam will have a register of about 195,000 scientists and 20,000 engineers for use in event of war and for statistical studies.

The National Science Foundation has just arranged with the American Chemical Society to begin registering 65,000 chemists. The Engineers Joint Council in New York is selecting 20,000 leaders from the nation's estimated 500,000 engineers for a "finder's list" to locate them for special projects.

Building upon the experience of World War II, ten professional societies and associations are now working on the National Register of Scientific and Technical Personnel, which they will keep up to date for immediate use in an emergency. In addition to the chemists and engineers, 50,000 biologists, 14,000 veterinarians, 18,000 geologists, 11,000 psychologists, 15,000 physicians, 10,000 meteorologists and 12,000 mathematicians will be included.

Science News Letter, June 19, 1954

## ENTOMOLOGY

# Real Insect "Miracle"

► THE REAL "miracle" of insect life is the unseen change of a butterfly to a caterpillar, not the visible transformation of the rather ugly caterpillar to a beautiful winged insect.

This is the conclusion of Dr. R. E. Snodgrass, collaborator of the Smithsonian Institution and the U. S. Department of Agriculture.

Because the change of caterpillars into the butterfly can be seen and is an event re-enacted every generation, it is often pointed to as a startling example of metamorphosis, or the transformation of one creature into another.

The real metamorphosis, Dr. Snodgrass has reported in "Insect Metamorphosis" (see SNL, April 17, p. 252), is that unseen one "which has changed a young butterfly into a caterpillar." The visible metamorphosis of the caterpillar into the butterfly is merely the return of the changed young to the form of its parents, he concludes.

In some way not yet fully understood, the insect egg of the butterfly becomes two individuals, each independent of the other, and each of which is born, leads its own life and dies. The cells that are eventually to become a butterfly remain dormant and undeveloped during the caterpillar's life cycle.

Two sets of hormones, those of the caterpillar and those of the butterfly, appear to control the development. First and most important of these biological chemicals to come into play is the "youth hormone," known to be secreted from glands located near the brain. The youth hormone, and probably others yet unknown, govern the caterpillar's development.

## PSYCHOLOGY

# Gulls Prefer Super-Egg

► BY EXPERIMENTS conducted with a flock of wild herring gulls, scientists were able to make an artificial super-egg that the female would sit on in preference to one that she herself had laid.

The super-egg is larger than the natural egg, and has more small spots. The spots are closer together and the contrast in color between spot and background color is increased.

The experiments were reported to the International Congress of Psychology meeting in Montreal by Prof. G. P. Baerends, zoologist of the University of Groningen, the Netherlands.

The preferences of the gulls were studied, Prof. Baerends said, by watching the wild gulls from a blind. The scientists would put an artificial wooden egg on the edge of a bird's nest and then observe the bird's behavior on its return to the nest. A meas-

As the caterpillar nears the end of its normal life span, the previously dormant butterfly hormones take over. They influence the butterfly cells in the caterpillar body to become the wings, pigments, eyes, etc., of a flying insect. The youth hormone, however, remains to regulate the butterfly's egg-laying functions.

Passage through the worm-like stage is not a telescoping of evolution, Dr. Snodgrass points out. In its evolutionary history, the butterfly never went through a larval stage, and the first insects on earth, at least 300,000,000 years ago, laid eggs from which hatched organisms very similar to their parents.

Although these insects were immature at birth, anyone who saw them would know that they were young insects, not young caterpillars.

"In attaining their present distinctive forms, the butterfly has followed out the evolutionary path adopted by its adult ancestors, and therefore represents the adult line of descent," Dr. Snodgrass states. "The caterpillar, on the other hand, in its evolution has departed from the ancestral path and has become a new and distinct juvenile form of its species.

"Since the caterpillar leads an independent life in a very efficient manner as an individual, it would seem that it might be capable of developing its reproductive organs to maturity and thus dispensing with the butterfly stage entirely."

This has not happened, Dr. Snodgrass concludes, because the butterfly can distribute eggs for the next generation of caterpillars over a wide area, thus preventing overpopulation in any one place.

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## HEMATOLOGY

# New Clotting Factor Extracted From Blood

► A POTENT new clotting factor in blood has now been extracted in purified form. It should aid treatment of bleeders who suffer from a lack of this substance.

The factor is called PTF-B, short for plasma thromboplastin factor B. It is different from PTF-A, or plasma thromboplastin factor A, which is the antihemophilic factor in blood.

From 10% to 20% of all patients thought to be suffering from hemophilia, the hereditary bleeders' disease, probably suffer from a deficiency of this newly discovered PTF-B. Dr. Paul M. Aggeler of the University of California School of Medicine estimates.

PTF-B was discovered by Dr. Aggeler and associates in 1952 in a 16-year-old boy, Kent Kincaid of Walnut Creek, Calif. Almost from birth young Kincaid suffered from internal bleeding that could only be controlled by blood transfusions.

At first, doctors thought he had hemophilia. Later, this diagnosis was doubted, especially as the anti-hemophilic globulin of blood was useless to stop his bleeding. At that time he needed two pints of plasma every two weeks.

PTF-B, Dr. Aggeler reports in *Science* (June 4), is found in the beta 2 globulins of blood plasma.

The latest findings were made with Drs. Theodore H. Spaet and Byron E. Emery, in studies at the University of California and Stanford University and the Veterans Administration Hospital in San Francisco.

Science News Letter, June 19, 1954

# How to Retire on the money you've got

You don't need a lot of money to retire in Florida, California, Hawaii, and other favorite retirement areas. You don't if you know just where it costs less to live and, if necessary, where you can pick up a moderate income through a part-time job or a small business.

*Where to Retire on a Small Income* selects out of the hundreds of thousands of communities in the U. S. only those places where living costs are less, where the surroundings are pleasant, and where nature and the community get together to guarantee a good time from fishing, boating, gardening,

concerts or the like. The book never overlooks the fact that some people must get part-time or seasonal jobs to pad out their income and it shows where such work is available.

It covers cities, towns, and farms throughout America—from New England south to Florida, west to California and north to the Pacific Northwest. It includes Hawaii, the Virgin Islands, etc. Some people spend hundreds of dollars trying to get information like this by traveling around the country. Frequently they fail—there is just too much of America to explore.

*Where to Retire on a Small Income* saves you from that danger. Yet it costs only \$1.

To retire young enough to enjoy it, tear out ad, and mail with name and address and \$1 to **HAROLD PUBLICATIONS, 21 Scranton Ave., Greenlawn (Long Island), New York.**

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## STATISTICS

**Baby Boom Continues Among College Grads**

► THE TREND toward larger families among married college graduates is still continuing, the Population Reference Bureau reports.

For the last eight years, since 1946, the number of babies per graduate has been going up. The increase is greater for men graduates than for women.

"There is even a possibility," says a report in the Population Bulletin, "that members of the class of 1944 will replace themselves in the new generation." Statisticians figure that each graduate must have an average of 2.1 children to be sure that one will live to grow up, marry and have children to carry on the chain unbroken.

The low was reached by men graduates in the class of 1922 with 1.70 children per graduate; by women in the class of 1926 with 1.18.

For many years in the United States the tendency among white women of child-bearing age has been for those with the most education to have the fewest children. The figure in 1940 was 1.23 for college graduates as compared with 4.33 for women who had not gone beyond fourth grade.

The institution leading in number of children per graduate, for men of both the class 1944 and the class 1929 and women for the class 1929, is Brigham Young University in Utah. But this university is outdistanced by the 1944 women graduates of St. Mary's College in Indiana.

The increasing fertility of recent college graduates is attributed to an improvement in economic conditions and to changing attitudes toward marriage. In the 20's and early 30's, marriage and birth rates were both low. People were marrying later in life.

Now that it is easier for young couples to set up their home and start families, they are marrying younger. Births are not deferred as often nor as long as they were 15 years ago.

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*Insects* have as many as 4,000 different muscles.

**MATH IS FUN**

By Joseph Degrazia, Ph.D.

Here is a treasury of brain-teasers. You need not be a mathematical genius to solve these problems and puzzles. What you need is to know how to THINK LOGICALLY—how to REASON. This is practically a "course" in applied logic and reasoning—besides being an immense amount of fun that will keep you absorbed for many hours. You will find not only that MATH IS FUN, but also that learning math can be fun!

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**Mountain Sheep**

► MOUNTAIN SHEEP, the native wild sheep of North America, suffer severely from what in Hollywood is a common enough occupational hazard, but which is rarely associated with the sheep family: an excess of good looks.

No panting love-sick ewe, even when the fall mating-season fever grips the flock and Pan is undisputed king, puts a higher valuation on the magnificent head of a mature ram than do certain kinds of trophy-proud, game-hunting bipeds.

The horns are broad and massive, with a bold curving sweep that starts at the forehead and turns on itself almost full circle, upwards, outwards, downwards and gently up again, so that the points are almost on a

## PSYCHOLOGY

**Individualized Education**

► A PLEA for individualized education was made by a Russian delegate to the International Congress of Psychology, Dr. B. M. Teplov of the Academy of Pedagogical Sciences of the U.S.S.R. (See p. 389.)

Psychologists from the western nations were surprised by Dr. Teplov's declaration because it seemed so different from the general Communist tendency toward mass treatment.

Dr. Teplov said that the personality type should be taken into account in applying an individualized method to a person's training and education as well as to his character formation and the development of all his intellectual and physical abilities.

However, his conclusion that individual temperament is distinctive and demands individual treatment is based on research, not on heredity, but on conditioned reflexes acquired during the lifetime.

People differ in the speed with which they acquire conditioned reflexes, Dr. Teplov found. Some types of reflexes are formed more readily than others, depending on the personality.

Dr. Teplov described experiments for reducing the sensitivity of the eye to light by

level with the eyes. This lovely downward spiral has been one of the causes of the mountain sheep's sharp numerical reduction.

Were a census of Bighorns to include not only the diminishing flocks scattered throughout the Rockies from Mexico to Canada, but also the stuffed heads on sportsmen's walls, the population would doubtless come to a healthy total. But subtracting the non-productive wall trophies, the survival situation is pretty shaky.

The severe decline of the Bighorn throughout the southern half of its natural range is only partially the fault of over-hunting. Disease has taken a heavy toll. Even more drastic has been the taking over of the native habitat as pasture for domestic sheep. Where sheep-grazing land is limited, man is sure to sponsor the interests of the money-making domestic sheep at the expense of the picturesque but un-economic wild variety.

Except for rigidly controlled hunting seasons in Idaho and Wyoming—where bag limits are carefully set to keep the mountain sheep population in healthy balance with local forage capacity—the animals are no longer fair game in this country. But despite severe penalties for unlawfully taking mountain sheep, a certain amount of head hunting still goes on.

Among professional wildlife managers, out-of-season, excessive or glutinous hunting always arouses the keenest contempt, but lawless depredations committed against Bighorns seem to offend some special sentiment or passion.

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means of conditioned reflexes. When the eye is adapted to darkness and then a light is turned on for a few seconds and simultaneously a noise is sounded, after a number of repetitions the sensitivity of the eye to light will be reduced just from the sound alone.

This, Dr. Teplov explained, is an example of a positive conditioned reflex. There is another type of conditioned reflex, a negative reflex, which serves the opposite purpose—as an inhibitor.

The speed with which a person acquires a positive conditioned reflex as compared with the speed of forming a negative conditioned reflex shows the predominance of excitation over inhibition, or the reverse, in his higher nervous system.

Individual differences in this regard have great practical importance to the educator and also to the physician, Dr. Teplov indicated.

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Parking and speeding problems are often as serious to small communities of less than 10,000 population as are the same problems to larger cities.

## MEDICINE

# High Blood Pressure

► MEMBERS OF the so-called weaker sex apparently can withstand high blood pressure much better than their husbands, brothers, sons and fathers.

A pilot study showing this was reported by Miss Annie Mary Lyle of the Prudential Insurance Company at the meeting of the Society of Actuaries in Chicago.

The mortality experience among 1,227 Prudential employees with high blood pressures ranging from slight to very marked was carried through a period ranging from six months to 20 years with periodic examinations. Statistics were kept for the group as a whole and for men and women separately.

The women, comprising 40% of the total number examined, showed a death rate much lower than that for men, and also much lower than that which had been anticipated for the women on the basis of normal underwriting procedures used by insurance companies.

"The group available for this study is much too small for the mortality ratios to be relied on for rating purposes and the

female mortality is incredibly low for reasons that are not apparent," Miss Lyle said.

"The difference between the sexes is so great, however, as to indicate that in future investigations, males and females should be studied separately. If a substantial difference is confirmed by an experience sufficiently large to be dependable, more lenient treatment of females with high blood pressure would be in order."

The study also indicated that electrocardiograms are of considerable value in judging high blood pressure cases, but that the X-ray does not appear to contribute anything.

"One is forced to the conclusion that women withstand the stresses of high blood pressure better than men do," Miss Lyle said, commenting on the trend over the 20 years.

Although the women in the group studied had more hypertension of moderate and marked degrees than did the men, on entering the experience, they showed a much lower death rate than did the men.

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## BIOPHYSICS

# Broken Bone Mending

► A GEIGER counter check on the blood supply through the thigh bone is expected to help surgeons get better results in repairing broken hips.

The new aid was announced by Dr. H. B. Boyd of the University of Tennessee College of Medicine at the meeting of the American Orthopedic Association in Bretton Woods, N. H.

In about a third of the cases of broken hips involving the head of the femur, or top part of the thigh bone, this part of the bone begins to crumble and die about 12 months to two years later. The condition results from inadequate blood supply to the top of the thigh bone. When this happens, a second operation is needed.

Unfortunately, the surgeon does not know at the time he repairs the broken hip whether the patient is likely to develop this condition, known as aseptic necrosis.

Dr. Boyd and associates believe this difficulty can be overcome by giving the patient a tracer dose of radioactive phosphorus. The largest amount of this will be carried by the blood to the bones.

Using a Geiger counter, the amount in the bone pieces on either side of the break can be measured. If there is as much radioactivity in the head of the bone as in the long part, the surgeon can conclude the blood supply to the top of the bone is sufficient.

If, however, the amount of radioactivity in the top of the bone is five to 10 times less than the amount in the long part, the blood

supply is probably not adequate and the chances are great that the patient will develop aseptic necrosis later. With this as a guide, the surgeon can modify the repair operation to decrease pain, disability and future reconstructive operations.

The test is now being tried on patients, but it will take about two years to determine the accuracy of the method.

Working with Dr. Boyd to develop the test were Drs. Donald B. Zilversmit and R. A. Calandruccio and Miss Betty Houston, research assistant.

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# Questions

ASTRONOMY—What precaution should always be taken when looking at the sun? p. 394.

□ □ □

BIOLOGY—How was the new Institute for Microbiology at Rutgers financed? p. 391.

□ □ □

NUTRITION—How could the world food supply be doubled? p. 395.

□ □ □

MEDICINE—What diet has been proved best for viral hepatitis patients? p. 390.

How could hormones prevent ruptured spinal discs? p. 393.

□ □ □

PUBLIC HEALTH—What is psittacosis? p. 389.

□ □ □

ZOOLOGY—What animals have now been found to make high frequency sound? p. 389.

□ □ □

Photographs: Cover and p. 387, National Advisory Committee for Aeronautics; p. 391, F. J. Higgins; p. 394, U. S. Air Force; p. 400, Gardiner Electronics Co.

## PHARMACOLOGY

## Double Drug for High Blood Pressure Marketed

► DOCTORS NOW have a double drug for treating patients with high blood pressure, or hypertension. The double drug combines two anti-hypertension drugs, Serpasil and Apresoline.

Apresoline is a phthalazine derivative. It has given good results in moderate and severe hypertension. Serpasil, derived from the root of an Indian plant, is noted for its quieting effect.

Doctors have been using both drugs, alone and together, for about a year. Results were often better than from either one alone. Now Ciba Pharmaceutical Products, Inc., of Summit, N. J., will market them combined.

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# • New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D.C., and ask for Gadget Bulletin 731. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

❶ **DISPENSER FOR** liquid plant food is made of a non-corrosive plastic and is fitted with a heavy-duty quart glass container. Attached to automatic sprinkling equipment, such as a garden hose with a whirling lawn waterer, the device maintains proper plant-food-to-water proportions for all working pressures and rates of flow.

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❷ **SPLICER FOR** magnetic recording tape permits unskilled persons to make a professional job of editing home or studio recorded programs. The device has a cutting arm with three knives, one of which can be pivoted to cut the tape at a perfect 90-, 67½- or 45-degree angle. The two side knives cut the splicing tape to the exact width of the recording tape.

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❸ **SUPERLONG MATTRESS**, designed especially for tall men who often cannot get their feet in bed with them, is six feet 10½ inches from end to end. The mattress is the new standard "king-size," set up by the National Bureau of Standards recently when it was discovered that the number of men over six feet tall has increased 70% since 1918.

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❹ **METAL DETECTOR**, shown in the photograph, is an electronic device that distinguishes metallic iron from other metals,

such as gold and silver. It also will detect black magnetic sands. It can be used to trace pipes and wires through cement, plaster or wood walls, or help find gold nuggets in streambeds, or coins and metallic jewelry on beaches.

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❺ **FOLDING SPATULA** jackknives into a monel sheath so that it can be carried in the breast pocket of a laboratory coat without danger of its cutting the fabric. The reduced overall length makes it easier and safer to carry. The blade locks securely when in the open position.

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❻ **FLOATING HOLDER** for fishhooks is molded of a styrene plastic and keeps 20 hooks free from tangling or snagging hands or clothing. If dropped in the water, it immediately bobs to the surface. Tiny built-in springs keep the hooks and snells neatly separated under tension.

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❼ **GRILL PLATE**, for persons who enjoy cooking for friends, can be used as a broiler, cookie sheet, grill, fryer and a serving tray for hot hors d'oeuvres. It works over a fireplace, kitchen range or in the oven. Its handle can be slipped off until needed, thus protecting hands from burns.

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❽ **NEEDLE THREADER** is a small mechanical device that accepts needle sizes three to seven. The needle is inserted eye-end-first into a hole and a lever is pressed. The maker says even a blind person can use it.

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## A FEW MEMBERSHIPS ARE NOW AVAILABLE

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6-19-4

## Do You Know?

A single crabgrass plant will produce 90,000 healthy seeds.

More than six times the present population of the United States, or 1,000,000,000 persons, could live on the food this country could produce.

*Avalanche* research stations have been set up in a number of European countries, particularly in Switzerland, to study the behavior of snow in varying climatic conditions on varying terrains.

The death rate from *tuberculosis* has dropped from 183.9 per 100,000 of population in 1900 to 12.6 in 1953.